

15th

\$5.50 A YEAR

February 9, 1957

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PAGES 81-96

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Atmospheric Effects

See Page 93

A SCIENCE SERVICE PUBLICATION

Kodak reports to laboratories on:

staying a trigger of corruption . . . how you, too, can measure small objects . . .
new materials for electronically modulated photographic printing

Against ozone

Ozone is a noxious gas. (When the man in the street hears that ozone is being used as an index of urban air pollution, he is confused, poor fellow—all the more if he is bright enough to remember from high school chemistry that ozone is O_3 , nothing but oxygen.)

A little ozone goes a long way. It triggers corruption. It attacks double bonds, the weak links in chains of carbon atoms. The "sun-cracking" that puts those growing fissures in GR-S (the vulcanizable butadiene-styrene copolymer that insulates us a little from winds that blow in southeast Asia) has been unequivocally pinned on ozone.

As a major producer of antioxidants, we have a clear duty to contribute arms to the fight on ozone. So we draw from our forges on the banks of the Holston in Tennessee the new *Tenamene 30 Antiozonant* (N,N'-di-2-octyl-p-phenylenediamine) and the new *Tenamene 31 Antiozonant* (N,N'-di-3-(5-methylheptyl)-p-phenylenediamine).

Here are no laboratory curiosities, coyly offered in little bottles without claims beyond identity. This is big business, for a recently tightened Army Ordnance specification tells in effect how much ozone exposure rubber goods must be able to stand under dynamic stress-and-relax conditions. Both the new *Tenamene* compounds help rubber weather and age more gracefully in non-dynamic use, too. *Tenamene 30*, in particular, survives heating of the GR-S very well, so as to be on hand to combat ozone.

These antiozonants may be purchased and introduced into rubber goods at the compounding stage even by manufacturers who have no Army Ordnance inspectors to get by.

Isn't it nice that all your favorite rubber goods manufacturer has to do, if he wants to find out what would be involved in giving you longer-lasting satisfaction from your purchases, is to write for information about *Tenamene 30* and *Tenamene 31* to Eastman Chemical Products, Inc., Kingsport, Tenn. (Subsidiary of Eastman Kodak Company)?

If you had one



If you had a little *Kodak Contour Projector, Model 8*, like this around the lab, you would like it. If you have frequent occasion to measure dimensions, angles, or configurations of relatively small objects, "you" could mean you. You lay them down on the glass stage and get a magnified shadow image of their contours on the circular screen. Depending on the lens used, you have a choice of six magnifications from 10X to 100X. You can have a chart over the screen as a guide. Alternatively, you can use the measuring stage for two inches of crosswise movement or one inch of movement the other way and read both of these displacements against a reference line on the screen to $\pm .0001"$. With the rotatable protractor ring around the screen, angles can be read to 5'.

In factory inspection departments this projector is usually set up horizontally on a work bench, with a special fixture to hold the part being inspected. Now, the same micrometers that go on the \$9,250 model, the measuring stage, and the protractor ring generalize the instrument for the laboratory.

This could use as little as \$835 of budget money (if you wanted no accessories and could snitch a *Kodak Contour Projection Ektar Lens* from some other department). On the other hand, if the man who drops in just to tell you about the mechanical and optical quality of this instrument signs you up for the full lineup of features and lenses, you could spend \$2,967.50. To summon him, write Eastman Kodak Company, Military and Special Products Sales, Rochester 4, N. Y.

Faster paper, artlessly dodged

We have doubled the maximum

speed available in photographic paper—the kind on which pictures can be printed from negatives.

Great as this news is, we must in candor admit that with the exception noted below there has been no strong demand for more paper speed than has been provided for many years now in *Kodabromide Paper*. Most photographers prefer a printing time long enough to permit a little artful dodging that compensates for local excesses or deficiencies in the density of the negative.

Actually the new paper is more than just muscle-flexing by our emulsion makers. It seems that there is some dodging now being done electronically. The faster paper is our contribution to certain recent developments that involve electronic scanning of the negative and modulation of the light source in accordance with the density of the particular portion of the negative being printed.

Among people who have a great many negatives from which to print a great many of the most informative possible positives, electronically modulated photographic printing is a very lively subject at the moment. This we can say without promising that the best and cheapest route from an uneven negative to a more even positive will forever remain electronic.

Nevertheless, finding we can bring out a paper that gives an electronically modulated print in 10 seconds where 20 would be required with papers that are plenty fast enough in conventional printers, we deem it a privilege to be of service, and let the future bring what it may.

The new material is tentatively designated *Kodak Photographic Paper, Grades 1370 and 1371*, the former lying between *Kodabromide Contrasts 1 and 2* and the latter approximately matching *Contrast 3*. For information about sizes, weights, surfaces, prices, etc., write Eastman Kodak Company, Professional Sensitized Goods Sales Division, Rochester 4, N. Y.

Prices quoted are subject to change without notice.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . serving laboratories everywhere

Kodak
TRADE MARK

PUBLIC HEALTH

AEC Report on Safety

Disposal of radioactive wastes and protecting future generations from harmful effects of radiation are two problems, among others, considered in the recent report.

► PROTECTING man from man-made radioactive death is still the big job for the Atomic Energy Commission, it appears from the AEC's Twenty-first Semiannual Report issued in Washington recently.

Establishing "graveyards" for radioactive wastes and keeping future generations from premature graveyards are but two of the many complex problems being tackled by scientists throughout the nation.

Here are some of the results of current research on the problems of radiation safety as contained in the latest AEC report:

1. Recent studies on the irradiation of mice in various stages of pregnancy at Oak Ridge National Laboratory and the New England Deaconess Hospital have shown that the effect on the young is closely correlated with the stage of embryonic development at which they were irradiated. By equating human and mouse gestation periods, it is thought that the most sensitive period for humans might be predicted.

"By this reasoning, the human embryo during the second through seventh week of a human pregnancy is potentially the most sensitive to radiation. Since pregnancy still may be unsuspected at such early times, it has been recommended that, whenever possible, pelvic irradiation of women of childbearing age should be restricted to the first two weeks following a menstrual period. This recommendation applies particularly to medical (diagnostic) irradiation. On the other hand, the present permissible weekly dose of irradiation which may be received in industry does not constitute a measurable hazard at any stage of pregnancy."

2. A number of studies support the theory that irradiated animals are more susceptible to injected bacteria, viruses and toxins, and that irradiation may stimulate a latent disease infection, such as typhus, to renewed activity.

3. Removal of oxygen before irradiation was found to protect cells against many kinds of radiobiological damage. Although impractical for man, the experiments demonstrated how widespread the effects of strong oxidizing substances were as a mechanism of biological damage resulting from penetrating radiation.

4. At least seven important research centers are currently engaged in studies to determine the effect radiation has on aging. The Commission says that "not very much is known about the quantitative relations between exposure to radiation and shortening of life," although the subject is considered very important.

The AEC's concern for radiation safety

was contained in a special report within the report.

"The total record of radiation safety in atomic energy operations," the AEC proudly stated, "is believed to be without parallel in industrial history."

The AEC claims that in 13 years no member of the public is known to have suffered an overexposure to radiation as a result of living near atomic energy production or laboratory centers or as a result of weapons testing.

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PSYCHIATRY

Mental Illness Key May Be in "Reward Centers"

► A POSSIBLE key to some varieties of mental illness may be "reward centers" in the brain and their selective control by drugs.

Research along these lines is being car-

ried out by Drs. James Olds, Samuel Eidson and Keith Killam of the University of California at Los Angeles Medical School in cooperation with the Los Angeles Veterans Administration Center.

It has been shown that some of these reward centers, which consist of tiny clumps of brain cells, are closely related to hunger drives, sex drives and others.

It was found that chlorpromazine modifies rewarding effects produced by stimulating some of these cells. Other tranquilizers seem to have similar selective effects.

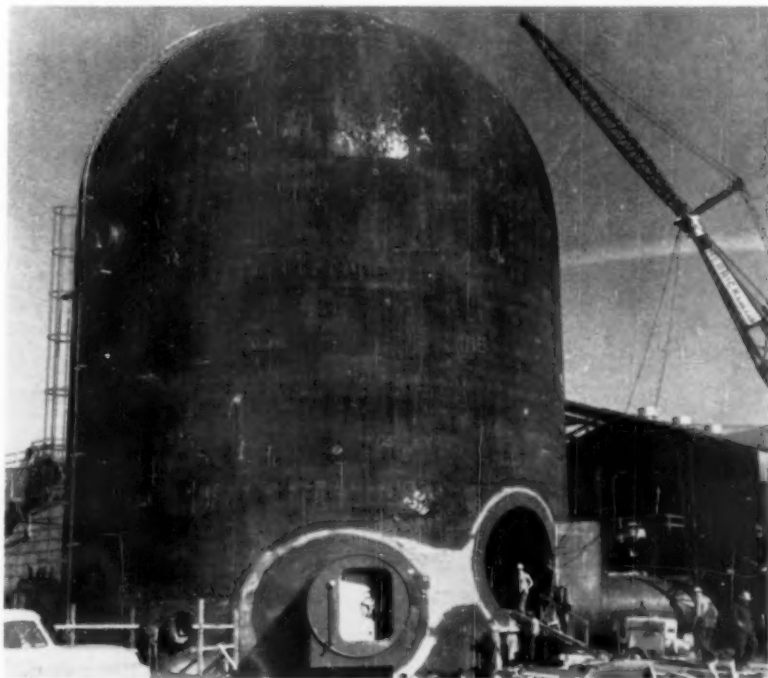
Schizophrenia, a catch-all category of mental illnesses, is thought to have its origin in an uncontrollable excess of basic drives or in insufficiencies of these drives, Dr. Olds points out.

Pinpointing of rewards systems associated with these drives and selective drug control within the systems may prove a breakthrough toward conquest of a number of mental diseases, he believes.

"Our preliminary studies have apparently provided us with a tool to evaluate drugs which exercise selective power to increase or decrease excitability in each of these reward centers," he says.

"Such drugs will augment or curb corresponding basic drives. This would provide us with a wide range of pharmacological agents to control many of the different kinds of mental illness that are now grouped loosely and called schizophrenia."

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FOR PRIVATE ATOMIC ELECTRIC POWER—The capsule-shaped containment vessel for the reactor at General Electric's Vallecitos Atomic Laboratory in California is nearing completion. The reactor will furnish steam for generating this country's first privately-financed atomic electric power.

PUBLIC HEALTH

Influenza May Strike

► INFLUENZA, one of the most unpredictable of communicable diseases, is resting "on cat feet" across the nation right now. It has already struck once this year in mild epidemic form at an Air Force base in Colorado. When and how severely it will strike again is a perennial riddle to public health authorities.

It will probably not lie dormant for the rest of the winter months. At the least, there will be sporadic outbursts of it throughout the country. If the right conditions occur, it could sweep across large areas of the U. S. practically overnight.

One fact health officials do know is that this fast-spreading respiratory disease occurs in cycles. The two most prevalent types, type A and type B, seem to return at regular intervals. Dr. C. C. Dauer, Influenza Information Center for the U. S. Public Health Service, said.

Type A seems to occur every two or three years, while type B seems to occur every three or four, he said.

"We are most likely to have outbreaks of type A this year, but how extensive they will be is not known," he added.

One of the constant problems facing public health officials is the variability of the influenza virus itself. Any sudden

change in the structure of the virus could quickly make presently used vaccines useless against the illness.

Just such a sudden change took place in the type A virus in 1947, Dr. Dauer said. Much of the vaccine then on hand was powerless, and the disease was able to spread unchecked.

In this country, a constant study of the virus structure is made by the Influenza Strain Center located in the Communicable Disease Virus Laboratory, Montgomery, Ala. So far there have been no indications of any major changes in the viruses, and the prepared vaccines now on hand are probably effective against them, Dr. Dauer said.

The variations in influenza epidemics are completely unpredictable, he added. Some epidemics cause no increase in deaths while others cause a considerable change in the general death rate.

Not all of these deaths can be attributed to respiratory complications like pneumonia, the health official said. Many times, the effects of influenza are "just enough to tip the scales" in victims of other diseases who are seriously ill.

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PALEONTOLOGY

No Africa-America Bridge

► AN ANCIENT "living bulldozer" and his strange relatives are helping to raise doubts about prehistoric land bridges that supposedly existed between Africa and South America.

The mammal-like "bulldozer" was a member of a family of animals called dicynodonts, plant-eating reptiles that roamed the earth 200,000,000 to 150,000,000 years ago. They ranged in size from a chipmunk to a rhinoceros.

Drs. Charles L. Camp and Samuel P. Welles of the University of California's Museum of Paleontology have recently published (University of California Press) a study that indicates the dicynodonts of North and South America and those of South and East Africa may have all belonged to a single family.

One theory has been that during the Triassic period (200,000,000 to 150,000,000 years ago) land connections may have existed over which the animals may have crossed from Africa to the New World via South America.

But the relationships and distributions of the fossil animals indicate the dicynodonts came to the Western Hemisphere over some northern bridge between Eurasia and North America.

Work with other fossil animals also sug-

gests the northern bridge, and there is evidence for a connection between North and South America at the same time.

The bones of the dicynodont that looked like a "living bulldozer," *Placeras gigas*, were found in the Arizona Painted Desert. It was the size of today's rhino, but looked like nothing now living. *Gigas* was flat-footed and plodding, and had a big head faintly resembling a turtle's. Its muzzle was covered by a horny beak, plus, in the males, a pair of short tusks along the face. The tusks were formed by the growth of bone rather than from teeth as in true mammals.

Gigas' hindquarters were elevated in the walking position and the short, massive forelegs were spread outward from the shoulder. He carried his heavy, barrel-like body on stout limbs, with the head probably tilted toward the ground and held low, giving the appearance of being ready to scoop up the sod.

The dicynodonts were the chief grass-eating reptiles of their day. They apparently used the tusks to root vegetation, then the toothless lower jaws moved in a fore-and-aft motion for chewing in a cupped or grooved part at the front of the mouth.

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• RADIO

Saturday, Feb. 16, 1957, 1:45-2:00 p.m., EST. "Adventures in Science" with Watson Davis, Director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Howard L. Bevis, Chairman of the National Committee for the Development of Scientists and Engineers, will discuss "The Need for Scientists and Engineers."

About 1,740,000,000 gallons of water was withdrawn from U. S. ground, lakes and streams each day during 1955.

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SCIENCE SERVICE

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GENERAL SCIENCE

Scientists of Tomorrow

Nine girls and 31 boys are picked as winners in the annual Science Talent Search. They will come to Washington to compete for \$11,000 in scholarships.

► THE 40 MOST PROMISING young scientists in America's high schools have just been selected in the Sixteenth Annual Science Talent Search. The winners, nine girls and 31 boys, have been invited to Washington for a five-day, all-expenses-paid visit March 7-11.

They will participate in the Science Talent Institute and compete for \$11,000 in Westinghouse Science Scholarships in the finals of the Science Talent Search conducted by Science Clubs of America, administered by SCIENCE SERVICE.

Nation-Wide Competition

The 40 trip-winners, 14 to 18 years of age, were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in the continental United States were invited to participate. Contestants, representing every state in the Union and the District of Columbia, totaled 20,145, of whom 3,122 completed the stiff science aptitude examination, submitted recommendations, and scholarship records, and wrote a report on "My Scientific Project."

In the past 16 years 224,916 high school seniors have taken the Science Talent Search aptitude test. Of this number only 44,048 have been able to complete all the requirements of the Search. This year, of the 20,145 examinations sent to 2,860 high school teachers, only 3,122 students cleared all the hurdles.

On March 11 at the end of the Science Talent Institute the judges will award the scholarships. One boy or girl will receive the \$2,800 Westinghouse Grand Science Scholarship (\$700 per year for four years). The runner-up will receive a \$2,000 Westinghouse Science Scholarship. Westinghouse Science Scholarships, ranging in size from \$100 to \$400 and bringing the total to \$11,000, will be awarded at the discretion of the judges to the rest of the winners.

Chosen without regard to geographic distribution, the 40 trip-winners come from 37 cities in 21 states. States represented by winners since 1942 now total 43.

Diversified Backgrounds

All of the winners live at home and attend their local or nearby public, parochial or private secondary schools.

Of the Science Talent Search trip-winners, 50% rank first, second or third in their graduating classes, which range in size from 20 to 1,145 students. Exactly 70% of the winners' fathers and 55% of their mothers

attended college. Of the winners, 19 claim no scientists among their relatives; the others have one or more scientists among their close or distant relatives.

Contrary to a frequent conception about scientists, the winners are not interested in science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and educational organizations outside their school work.

School Records

Only one high school in the United States has produced more than one winner this year. Erasmus Hall High School, Brooklyn, N.Y., will send one boy and one girl to bring their 16-year winner total to 10.

Seventeen of the winners this year come from schools that have never before placed a winner in the annual Science Talent

Search. The other 23 added new laurels to schools already honored in the past by having produced winners. Each school having a winner receives a bronze and walnut plaque for the school's collection.

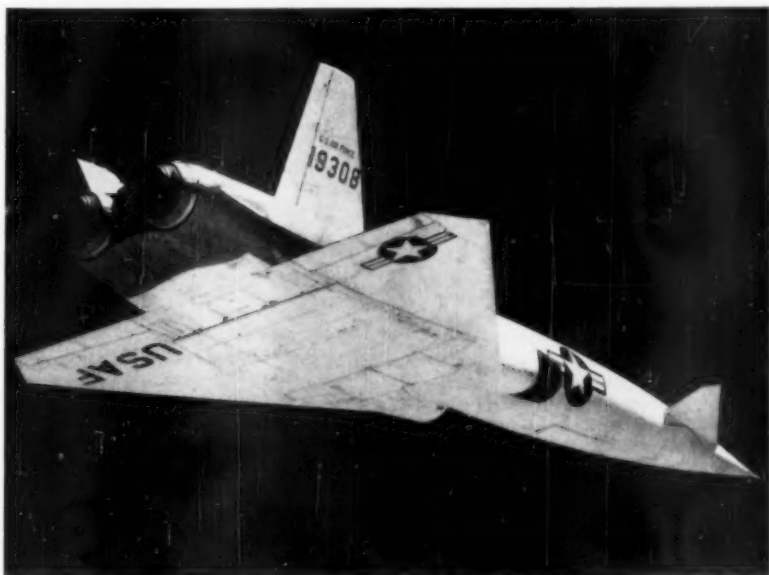
The honor of being all-time top-producer of winners goes to Forest Hills (N.Y.) High School. Their 16-year total is 21 winners.

The 16-year production of winners stands at 12 for Midwood High School, Brooklyn, N.Y.; at 11 for Evanston (Ill.) Township High School; at seven for New Rochelle (N.Y.) High School and at four for Central High School, Tulsa, Okla.

The following schools have produced three winners each in the 16 years of the Search: Arlington Heights (Ill.) Township High School; University High School, Bloomington, Ill.; Central High School, South Bend, Ind.; Barringer High School, Newark, N. J.; Monroe High School, Rochester, N. Y.; Andrew Jackson High School, St. Albans, N. Y.; North Salem High School, Salem, Oreg.; Mt. Lebanon High School, Pittsburgh, Pa.; and Columbus High School, Marshfield, Wisc.

With their winners this year these schools now have the distinction of having produced two winners in the 16 years of the Search: Abraham Lincoln High School, San Francisco, Calif.; Niles Township High School; Skokie, Ill.; Weston (Mass.) High School; Geneva (N.Y.) High School; Archbishop Stepinac High School, White Plains, N. Y.; Austin (Texas) High School; and Stonewall Jackson High School, Charleston, W. Va.

All of the top 40 already have chosen the lines of study they wish to pursue. Nine



TEST VEHICLE—The X-10, an unmanned test vehicle for the Air Force SM-64 Navaho intercontinental strategic guided missile weapon system program, is shown in one of its first released photographs. The X-10 has been successfully flown at high supersonic speeds in a series of tests carried out to prove the missile's aerodynamic design, as well as its guidance and control systems.

plan to become physicists. Eight hope to be chemists, six aspire to careers in medicine and five plan to be engineers—electrical and aeronautical. Two each plan careers in astronomy, bacteriology, and biochemistry. Their number also includes a geologist, botanist, mineralogist, biologist, zoologist, and teacher of science and mathematics. All expect to do research.

Honorable Mentions Awarded

In addition to the 40 trip-winners, who will attend the Science Talent Institute in Washington, an Honorable Mentions list of 260 in the Sixteenth Annual Science Talent Search will be announced Feb. 13. These high ranking contestants will be recommended to colleges and universities for their aptitude in science. They will receive offers of scholarships from many institutions of higher education seeking students with talent in science.

State Science Talent Searches

Through an arrangement with Science Clubs of America, 31 states and the District of Columbia are conducting state Science Talent Searches concurrently with the national competition. Thirteen of them have produced winners this year. In these 32 areas all entries in the national Science Talent Search will be turned over to state judging committees. From their entries they will choose state winners and award scholarships to various colleges and universities within the state. Cooperating states are: Alabama, Arkansas, Connecticut, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nebraska, New Hampshire, New Mexico, North Carolina, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, West Virginia and Wisconsin.

Sponsorship of Search

The Westinghouse Educational Foundation, supported by the Westinghouse Electric Corporation, provides the awards and makes the Science Talent Search financially possible as a contribution to the advancement of science in America.

The Annual Science Talent Search is conducted by Science Clubs of America, administered by SCIENCE SERVICE. Science Clubs of America is the international organization for science groups in schools and out. Today more than 16,000 clubs are affiliated here and abroad, with a membership of more than one third of a million young people.

Judges of the Science Talent Search are Dr. Harold A. Edgerton of New York City, Dr. Steuart Henderson Britt of Chicago, and Dr. Rex E. Buxton, of Washington, D. C. Drs. Edgerton and Britt design the Science Aptitude Examination each year for the Science Talent Search.

Science News Letter, February 9, 1957

GENERAL SCIENCE

Washington Trip Winners

HOME ADDRESS follows name of school

		ARIZONA	
Phoenix	Brand, Warren Louis	16	Phoenix Camelback H.S. 2435 E. Fairmont St.
		CALIFORNIA	
San Francisco	Rauscher, Warren Carleton	17	Abraham Lincoln H.S. 121 Morningside Dr. 27
		COLORADO	
Greeley	Ehn, Dennis Clifford	17	College H.S. Route 1, Ault
		GEORGIA	
Atlanta	*Hollingshead, Dorothy Anita	17	Murphy H.S. 2705 Boulevard Dr., S.E. 17
		ILLINOIS	
Arlington Heights	Hanor, Jeffrey Sydney	17	Arlington Heights Township H.S. 729 S. Highland Ave.
Charleston	*Iknayan, Susan Kathleen	17	Charleston Community Unit H.S. 938 Sixth St.
Decatur	Chaniot, George Edward, Jr.	17	Decatur H.S. 1069 W. Prairie St.
Evanston	Curry, John Lamar	17	Evanston Township H.S. 618 Lincoln St.
Skokie	Pollock, Edward Jay	16	Niles Township H.S. 8555 N. Lawndale Ave.
		INDIANA	
Bloomington	Cuffey, Roger James	17	University H.S. 522 Eastside Dr.
Indianapolis	Eikenberry, Eric Franklin	17	Broad Ripple H.S. 5903 Gladden Dr. 20
South Bend	Nordgren, Brett Marcus	17	Central H.S. 1048 Goodland Ave. 28
		KANSAS	
Neodesha	*Beach, Rochelle Ruth	17	Neodesha H.S. 916 Illinois St.
		MASSACHUSETTS	
Weston	Phillips, Charles Thomas	16	Weston H.S. Tabor Hill Rd., RFD, S. Lincoln
		MICHIGAN	
Lansing	Luehrs, Dean Carl	17	Everett H.S. 914 S. Dexter Dr.
		MISSOURI	
Neosho	Adams, David Bachrach	17	Neosho H.S. 324 S. Valley St.
		MONTANA	
Missoula	Silver, Jack Howard	14	Missoula County H.S. 621 Stephens Ave.
		NEBRASKA	
Omaha	*Anderson, Sonia Ruth	17	Technical H.S. 6107 S. 18 St. 7
		NEW JERSEY	
Newark	Ullrich, Felix Thomas, Jr.	17	Barringer H.S. 6 Myrtle Ave. 7
		NEW YORK	
Bayside	Adler, Stephen Louis	17	Bayside H.S. 36-12 Cpl. Kennedy St., 61
	*Michael, Sandra Lee	16	Erasmus Hall H.S. 403 E. 4 St. 18
Brooklyn	Shapiro, Howard Maurice	15	Erasmus Hall H.S. 220 E. 19 St. 26
	Glogower, Jonathan David	15	Midwood H.S. 774 E. 35 St. 10
	Gorman, Richard	16	Samuel J. Tilden H.S. 5310 Clarendon Rd. 3
Forest Hills	*Sprenk, Kullikki Kay	17	Forest Hills H.S. 30-11 165 St., Flushing 58
		GENEVA	
Geneva	Albro, Phillip William	17	Geneva H.S. 13 Linwood Ave.
New Rochelle	*Margolish, Merry A.	16	New Rochelle H.S. 128 Trenor Dr.
Rochester	Goldstein, Robert Edward	16	Monroe H.S. 1160 Monroe Ave. 20
St. Albans	Landman, Maurice Alan	16	Andrew Jackson H.S. 185-06 Murdock Ave. 12
White Plains	Ryan, Philip Meade	17	Archbishop Stepinac H.S. 15 Tunstall Rd., Scarsdale
		OHIO	
Archbold	*Schlatter, Violette Elizabeth-Emma	17	Archbold H.S. R.R. 1
Tipp City	Nieman, George Carroll	18	Tippecanoe H.S. R.R. 2
Westerville	Deamer, David Wilson, Jr.	17	Westerville H.S. 167 N. State St.
		OKLAHOMA	
Tulsa	Gilmartin, Michael Cooper	16	Central H.S. 4959 E. 26th Pl. 14
		OREGON	
Grants Pass	Baldersee, Willis Willard, Jr.	17	Grants Pass H.S. 737 N.W. Kinney St.
Salem	*Simila, Marjorie Kay	18	North Salem H.S. 1334 Marion St.
		PENNSYLVANIA	
Pittsburgh	Burnham, David Charles	17	Mt. Lebanon H.S. 475 Morrison Dr. 16
		TEXAS	
Austin	Reichert, John Douglas	18	Stephen F. Austin H.S. 2803 Bonnie Rd. 3
		WEST VIRGINIA	
Charleston	Greenlee, Donald Ray	17	Stonewall Jackson H.S. 1218 Garvin Ave. 2
		WISCONSIN	
Marshfield	Adler, Robert William	17	Columbus H.S. 309 Magee St.

NECROLOGY

Chemistry Editor Dies

► MRS. HELEN MILES DAVIS, 61, chemist and editor of the magazine *CHEMISTRY*, died of cancer Jan. 25, at Suburban Hospital, Bethesda, Md.



HELEN MILES DAVIS

She was the wife of Watson Davis, director of *SCIENCE SERVICE* and editor of the *SCIENCE NEWS LETTER*. Other survivors are a daughter, Mrs. Calvin N. (Charlotte Davis) Mooers, and a son, Miles Davis, both of Cambridge, Mass.

Born in Washington, D. C., April 13,

1895, she was the daughter of the late Henry R. Miles and Charlotte Ketcham Miles. She had resided at 1422 Rhode Island Avenue, N. W., Washington, D. C., for 35 years. She spent her childhood in Harpers Ferry, W. Va.

Graduated from George Washington University College of Engineering with a B.S. in Chemistry degree in 1918, she specialized in the popularization of science, especially chemistry, and the history of science. Since 1944 she had edited *CHEMISTRY* magazine which is used especially in high schools. The following books were written or edited by her: *THE CHEMICAL ELEMENTS*, *SCIENTIFIC INSTRUMENTS YOU CAN MAKE*, *ATOMIC FACTS*, *SCIENCE EXHIBITS*, *CHEMISTRY SHOW BOOK*, *EXHIBIT TECHNIQUES*. Her compilation of "New Laws of Matter" has run through five editions since its compilation just after announcement of the atomic bomb.

As chemistry writer for *SCIENCE SERVICE*, she reported the Geneva (1955) conference on the peaceful uses of atomic energy, an atomic bomb test, and numerous meetings of the American Chemical Society and other scientific societies.

She was a member of the American Chemical Society, Chemical Society of Washington, the Congressional Press Gallery, Sigma Kappa sorority and the Eistophos Club.

Science News Letter, February 9, 1957

METEOROLOGY

Daily Jet Stream Data

► DAILY PREDICTIONS of the position of the "jet stream," the fast-moving current of air high in the atmosphere that often is used by pilots to speed up west-to-east flights, may become part of routine weather service. It has recently been the key to new records set on coast-to-coast flights.

The core of this high, fast wind tunnel has been located and plotted on maps for the entire United States, the American Meteorological Society meeting in New York was told. Lt. Comdr. J. W. Hinkelman, U.S.N., reported the research he conducted with Dr. Herbert Riehl of the University of Chicago, based on information supplied by the U. S. Weather Bureau.

They found the jet stream core is about 4,000 to 15,000 feet thick. There the winds vary no more than 10% of the average core speed, which can range from 80 to 230 miles per hour. The jet stream system itself moves across the U. S. as slowly as 20 miles an hour, and rises or descends about 3,000 feet in a day from its average position of about 30,000 feet.

Knowledge of jet streams is becoming increasingly important as more jet aircraft come into commercial and military use.

Pilots can use them for an added "lift" when headed eastward, try to avoid bucking them at any time. Often it is more practical to take the longer, but faster, twisting trail of the jet stream than a shorter straight course with slower tail winds.

The jet streams plotted by Dr. Riehl and Cmdr. Hinkelman were those of the winters of 1954 and 1956. They found that frequently the stream entered the U. S. over the Pacific Northwest, snaked across the country and headed out over the Atlantic over the New England states.

Predicting progress of the winding stream is comparatively simple because it maintains its original configuration from day to day, shifting about 20 miles an hour. The research was part of the U. S. Navy's Project AROWA.

Weather predictions using mathematical formulas are up to 90% accurate for the eastern U. S., but "worse than no forecasts at all" for the area between the Continental Divide and the Mississippi Valley, Dr. Sverre Pettersen, director of the University of Chicago's weather forecasting research center, told the meeting.

Dr. Pettersen analyzed results of two approaches to numerical weather predictions. Both methods forecast weather by means of complicated mathematical formulas. The forecasts for upper levels of the atmosphere and therefore for aviation purposes proved quite accurate.

The two mathematical techniques are the physical model, in which the laws of physics are applied to the thermodynamics of the atmosphere, and the statistical model, in which data of the past and the present are applied to the future.

The simple physical model, which uses data from only one level, at present is best for forecasting wind systems in the middle part of the atmosphere.

Science News Letter, February 9, 1957

PHYSICS

Theory of Electron Flow in Metals

► A THEORY that explains for the first time how the swarms of electrons in copper wire behave was reported by Dr. Keith A. Brueckner of the University of Pennsylvania.

The theory also explains three other problems that have been a puzzle to physicists for many years. Dr. Brueckner said at a symposium on the Many-Body Problem held at the Stevens Institute of Technology. Mathematics for the theory is so complicated that only the very high-speed computing machines, or "brains," can handle the equations.

Dr. Brueckner said he and his collaborators used the IBM-704 at Los Alamos Scientific Laboratory, Los Alamos, N. Mex., to help solve the problems. Those working with him included Dr. J. L. Gammel of Los Alamos, Dr. Murray Gell-Mann of California Institute of Technology and Kuro Sawada, a Japanese physics student at Los Alamos.

The electrons carrying the electricity, as in ordinary household wiring, behave like a gas. Drs. Brueckner and Gell-Mann have been able to determine mathematically the exact energy of such a system at very high density.

The other problems solved by similar methods include the behavior of very large nuclei, or atomic cores, such as uranium or gold, and an explanation of the properties of both helium-three and helium-four at temperatures near absolute zero, which is 459.7 degrees below zero Fahrenheit.

The symposium was the first ever held on the many-body problem, one of the oldest problems in physics. It concerns predicting from theory the behavior of a large aggregate, such as particles in a nucleus or very cold helium atoms, when the behavior of some of its parts is known. The difficulty is projecting the known information on a vast scale, involving, for instance, the interrelationships of the billions of atoms in a grain of sand.

Dr. Brueckner reported his studies are continuing in the hope of obtaining even more exact solutions to the equations.

Science News Letter, February 9, 1957

SURGERY

Straighten Twisted Legs By Removing Calf Bone

► **DEFORMED LEGS** and twisted feet have been straightened by removing a tight band of useless fiber tissue from the calf of the leg, three New York surgeons told the American Academy of Orthopaedic Surgeons meeting in Chicago.

The fibrous band is all that remains of what should have been the calf bone, the smaller, outer bone of the lower leg. This bone does not develop embryonically the way it should, probably due to injury during the sixth or seventh week of prenatal life, Drs. T. Campbell Thompson and L. Ramsay Straub, Cornell University Medical College, New York, and Dr. William D. Arnold, Hospital for Special Surgery, New York, reported.

When this tight fibrous band is present, it creates tension much like that of a bow string. The result is a bowed leg and a foot that is twisted into a club shape or other deformed position.

By cutting out the tight band, the deformity can be corrected, they said. Although the operation does not correct the leg shortening that is found with this condition, it does enable patients to walk with ease and enjoy full activities in an elevated shoe or a simple elevated brace, they said.

Science News Letter, February 9, 1957

PHYSICS

Device Could Tell Tiny Temperature Changes

► **A DEVICE** so sensitive it could detect temperature changes of only a few degrees at great distances was reported to the American Physical Society meeting by Dr. Malcolm W. P. Strandberg of Massachusetts Institute of Technology.

He told how this amplifying device, called a Versitron, could be attached to a radar set, increasing the radiated power of the transmitter 1,000 times. Pushed to "absurd limits," he said, it would allow constructing an instrument that could detect miles away whether a soldier had a fever or not.

Its response to changes of a few degrees would take place within a fraction of a microsecond, which is a millionth of a second. Although Dr. Strandberg did not so state, such a device obviously could be built into an instrument to spot intercontinental missiles or any other object whose temperature differed by a few degrees from its surroundings. Thus it would find wide use not only for national defense but by radio astronomers studying the heavenly sources of radio waves.

Dr. Strandberg said the Versitron would be particularly applicable at frequencies typical of those used for television broadcasts and higher, including those for radar and microwave relay links. Its chief advantage is a very low level of "noise," called "snow" when it appears on a TV set.

Developing the device would be a prac-

tical application of theoretical and experimental research in paramagnetics, which is now being conducted under Dr. Strandberg's direction at MIT and which he described at the meeting in New York. Other laboratories are also doing similar research.

Conventional amplifiers now available use the current that results from the translational motion or flow of electrons in matter or space. The Versitron, meaning essentially "spin-tool," would use instead the electrons' spinning, gyroscopic motion in a magnetic field.

Research in both the United States and Russia, Dr. Strandberg said, has shown that paramagnetic materials absorb waves of radio and microwave frequencies when they are placed in a magnetic field. The absorption frequency depends not only upon the atoms and the crystal, but upon the applied magnetic field.

Science News Letter, February 9, 1957

PUBLIC HEALTH

Mad Bats Offer Clues About Spread of Rabies

► **MAD BATS**, infected with the dreaded rabies virus, have been discovered in many areas of the U. S., and public health officials hope that a study of them will throw new light on how this dangerous disease can be spread from animal to man.

Although the South American vampire bats have long been known to transmit rabies, it was never suspected that the insect-eating variety found in this country harbored the disease. But in Tampa, Fla., in 1953 the first rabid insect-eating bat was discovered, after it had bitten a human. Since then, 150 other rabid bats have been reported in this country, the Communicable Disease Center, Public Health Service, Atlanta, Ga., reported. The bats have been found from New York to California and from Michigan to Texas.

So far, four species of tree-living or solitary bats and nine species of colonial or cave-dwelling bats have been implicated.

These discoveries have stirred up a great deal of interest among public health officials, Dr. C. C. Dauer, medical adviser, U. S. Public Health Service, said.

"These bats do not present a public health problem of any great magnitude to humans," he said, "although they might be an important public health problem to animals."

There has been speculation for years about the source of rabies in wild animals, such as foxes and skunks, but the idea that bats are responsible has never been proved, he said.

Possibly these rabid bats have existed here in the U. S. all the time, and we have just come to realize it within the last few years, he said.

Domestic animals are not in any particular danger from bats either, Dr. Dauer added. Most of the bats prefer to live in isolation and would rarely come in contact with these other animals, he said.

Science News Letter, February 9, 1957

IN SCIENCE

ASTRONOMY

International Program For Observing Stars

► **AN INTERNATIONAL** program to chart the positions of 21,000 stars during the next five years is underway at 12 observatories.

The U. S. Naval Observatory in Washington will carry out most of the observations and will compile the final catalogue of positions for these stars. Since each star is to be observed ten times, the total number of observations, including those of fundamental stars, will amount to 260,000.

This international undertaking will provide astronomers with a precise reference system for determining proper motions, Dr. K. Aa. Strand, director of Northwestern University's Dearborn Observatory, Evanston, Ill., reports in *New Horizons in Astronomy*, first publication in a new series, Smithsonian Contributions to Astrophysics.

The values for stellar motions obtained from the survey are expected to shed light on the size of the Milky Way galaxy in which the sun, the earth and the other planets are located. The program is being coordinated with another underway at Lick Observatory, Mt. Hamilton, Calif., to determine proper motions of stars with respect to objects beyond the Milky Way.

Science News Letter, February 9, 1957

MEDICINE

Swollen Cell "Fingers" Impair Kidney Function

► **UNDER** the electron microscope, kidney cells seem to have "arms," "hands" and "fingers." And when disease sets in, the "fingers" may become swollen, thus impairing the normal functioning of the kidney.

This is the picture suggested by Dr. Daniel Pease of the University of California at Los Angeles Medical School.

Dr. Pease, professor of anatomy, is one of a few researchers in the country working medically with the electron microscope. He recently showed detailed pictures of kidney cells before the Council of High Blood Pressure Research, meeting in Cleveland.

The electron microscope studies have revealed that kidney cells have arm-like extensions. The "fingers" surround the exceedingly small blood vessels of the kidney where urine is formed.

One of the characteristics of the normal cells is that the "fingers" are fairly wide apart. It has been speculated that disease might swell the "fingers," causing them to come into contact with one another and impair their function.

Science News Letter, February 9, 1957

CE FIELDS

CHEMISTRY

Reason Found for Light Hair in Mental Disorder

► **PHENYLALANINE**, an amino acid found in protein foods, is responsible for the light-colored hair found in an unusual mental deficiency disease, Drs. Masamitsu Miyamoto and Thomas B. Fitzpatrick, University of Oregon Medical School, Portland, report in the journal *Nature* (Jan. 26).

The disease, phenylketonuria, is a rare hereditary disorder in which the victim never develops normal mentality. It is diagnosed by the presence of phenylpyruvic acid in the urine, due to the body's inability to metabolize the phenylalanine.

More than three-fourths of those having the disease also have blond hair and light complexion. Some of them even approach albinos.

This lightness of hair and complexion results from a breakdown in the normal reaction between two body chemicals which form melanin, the pigment responsible for body color, the investigators reported.

Normally, melanin is formed by the action of the enzyme tyrosinase upon tyrosine, another amino acid. But when an increased amount of phenylalanine is present, as it is in patients with phenylketonuria, this reaction is inhibited and normal melanin formation cannot take place, the scientists believe.

These patients, when fed synthetic diets that are lacking in phenylalanine, begin to get darker hair. The hair also darkens if large amounts of tyrosine are given orally.

This takes place because the excess amount of tyrosine restores the normal ratio of tyrosine and phenylalanine in the body and results in normal melanin formation, the doctors reported.

Science News Letter, February 9, 1957

MEDICINE

Increase in Leukemia Death Rate Puzzling

► **THE** climbing leukemia death rate in five western states has scientists puzzled. Most possible explanations are still only question marks.

In the eight years between 1946 and 1953, Dr. Brian MacMahon of New York State University's College of Medicine, New York, reports that the leukemia death rate in Nevada, Utah, Arizona, Idaho and Montana has almost doubled. In Montana and Idaho the increase in the death rate from the fatal disease was more than that in any other state in the same or in the preceding eight years.

The increase is not due to changes in the age distribution of the population, Dr.

MacMahon states in the Public Health Reports (Jan.), published by the U. S. Department of Health, Education and Welfare in Washington.

Nor can it be definitely stated that it is caused by better diagnosis and reporting.

One possibility which proved to be baseless was the increased radioactivity in the area brought on by atomic tests in Nevada. Dr. MacMahon points out that the rise in leukemia death rate began in 1947-48, even before the great majority of the tests were started.

This possibility, that radioactivity has contributed to the increase in leukemia death rates, Dr. MacMahon says, can be eliminated.

At best, he finds, the trend in leukemia mortality in these states in the next few years deserves continued attention.

Dr. MacMahon also reports that there is a belt of high leukemia death rates stretched across the northern states, west of the Mississippi.

In plotting the geographic pattern of leukemia deaths in this country, Dr. MacMahon found Minnesota had the highest rate, 79.2 deaths per million, and Maine, the lowest, 50 deaths per million.

Science News Letter, February 9, 1957

SURGERY

Crippling of Crushed Hands Prevented

► **AN INJECTION** of the enzyme hyaluronidase can prevent the permanent crippling of hands and fingers that have been accidentally crushed, Dr. Carl E. Nemethi of California Lutheran Hospital, Los Angeles, reported to the American Society for Surgery of the Hand meeting in Chicago.

Hyaluronidase prevents or decreases the swelling that takes place in injured tissue, an occurrence which restricts the blood supply to the injured area, Dr. Nemethi reported. This blood supply decrease is believed to be a factor in crippling, he said.

Hyaluronidase was used in about 200 cases and helped reduce the post-operative pain and permitted hand motion necessary for maximum recovery.

One case described was that of a 32-year-old factory worker whose hand was crushed when 1,000 pounds of steel fell upon it. The preservation of a blood supply gave him a useful hand after an accident which might otherwise have resulted in amputation, Dr. Nemethi said.

He also emphasized that surgical and medical care should be given "within minutes and not hours following injury."

"In a majority of cases the patient is made comfortable by aspirin, eliminating the need for narcotics, barbiturates or derivatives," he said.

On the first post-operative day all of them exercised their fingers and thumb freely without restrictive motion pain, and most of them returned to work on the second or third day to one-handed jobs, using the uninjured hand, he said.

Science News Letter, February 9, 1957

MEDICINE

Tranquilizing Drug Slows Cancer Growth

► **RESERPINE**, one of modern medicine's most famous tranquilizers, is also effective against leukemia in mice, researchers at the National Institutes of Health, Bethesda, Md., report in *Science* (Jan. 25).

A single injection of the drug almost tripled the remaining lifetime of mice in advanced stages of leukemia, after having received an inoculation of leukemic cells.

Aside from extending the lifetime of the mice, the drug also had a marked effect upon the size of the local tumor which developed at the inoculation site. Two days after reserpine treatment, the tumor had ceased to grow, and from then on its decrease in size was proportional to the drug dosage.

These local tumors frequently seemed to disappear completely after reserpine treatment. "However, transplantation of spleen from several such mice resulted in leukemic growth, indicating that 'systemic infiltration' had not been wholly suppressed," the scientists report.

The high doses of the reserpine used created severe depressions in the animals, however, and all of them lost an average of 30% of their total body weight. But when this depressant effect was counteracted with another drug, the antileukemic action still remained, the scientists say.

Although not as active an antileukemic drug as amethopterin, reserpine and several of its derivatives now make available new antileukemia agents for laboratory study, the investigators report.

Drs. Abraham Goldin, Stewart R. Humphreys, and John M. Venditti, National Cancer Institute, and Dr. Robert M. Burton, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Md., report the studies.

Science News Letter, February 9, 1957

PHYSICS

Final Planning for Giant Accelerator

► **FINAL** plans are being made for construction at the James Forrestal Research Center, Princeton, N. J., of a three-billion-electron-volt particle accelerator that will cost more than \$6,000,000.

The new machine, largely financed by the Atomic Energy Commission, will be run jointly by Princeton University and the University of Pennsylvania. It will be used for unclassified research on the basic structure of matter.

The proton accelerator is designed to produce heavy mesons in much larger quantities than heretofore available, and to produce at least 50 times the proton current now available.

Architect-engineers for the three-year construction project are Gibbs & Hill, Inc., New York.

Science News Letter, February 9, 1957

PHYSICS

Edison, the Experimenter

On Feb. 11, the country will celebrate the 110th birthday of Thomas A. Edison who, with his inventions, has contributed in many ways to the comfort and well being of man.

► THE TREMENDOUS contributions of Thomas Alva Edison to the comforts and conveniences of modern life can be traced directly to his fondness for experimenting.

When Edison did not understand how or why something worked or failed to work, he did not rest until he had tried experiment after experiment to find the answers.

He began this habit as a young boy. He built his own experimental laboratory. Saving every penny that he could earn for the purpose, he purchased chemicals and books about science. He made his own simple apparatus. And it was not expensive!

Born in Milan, Ohio, February 11, 1847, Thomas Alva Edison "lighted the world" with incandescent lamps, reproduced voices and sounds with the phonograph, pioneered in motion pictures and radio, and developed over 1,100 inventions through his experimental approach to nature.

Today, many of the achievements of science—new methods for better communication and greater enjoyment, devices for industrial triumph and human progress—are being built on the foundations laid by the man whose birthday will be honored February 11.

During his life and since his death in 1931, Edison has been best known for the incandescent lamp which has lighted homes, businesses and most of civilization since its invention in 1879. Next in fame is probably the phonograph, produced when the inventor was 30 and probably his favorite invention. A less well-known experiment by Edison, which he himself made little use of, may loom more important to historians of science in the future than either the lamp or phonograph. This was "the Edison effect."

Birth of Electronics

In 1883, Thomas Edison put a cold piece of metal opposite the metal wire filament inside an electric light bulb. Electrons flowing along the wire created an electrical current. The filament, heated by the flow of electric current through it, emitted electrons and a minute electric current flowed along an external wire connecting the plate and filament. Edison showed that this current would always flow in the same direction. The discovery became known as the "Edison effect." Edison tried to put this discovery to work and secured the first electronics patent. The device was to control the output of dynamos or electric generators, but it did not prove satisfactory for this purpose.

When many years later Sir J. Ambrose Fleming and Dr. Lee De Forest modified the tube and it was used to detect radio waves, the modern electronics industry was born. Radio, television, radar and other electronic devices came into being.

The first of many patents granted Edison was one in 1868 for an electric vote recorder for the U. S. House of Representatives. The device, similar to many now used by legislative bodies, worked too well to suit a committee of the House, because it would have put an end to filibustering on votes.

Thus, although his first invention failed, political science rather than natural science was to blame.

Stock Ticker Invented

The next year the young inventor devised a stock ticker. For his improvements and inventions simplifying the transmitting devices of the stock exchange, he expected to receive at least \$3,000. Instead, he was offered \$40,000.

With this money, as with the fortunes he later gained from his work, he turned to new experiments and inventions. A mere list of the more than 1,100 inventions made by Edison, tells only part of the story of his accomplishments. Machines for multiple telegraph transmission, the electric pen and the mimeograph, the microphone and the megaphone are illustrative of his industry. The phonograph was revolutionary. Never before Edison had the idea for an apparatus to reproduce the human voice been put into a patent application.

Edison always said that the phonograph was his favorite invention. Perhaps this was because of his deafness, which made him place an unusual value on sound. In his pioneer work in motion pictures, he created the first motion picture studio, and used the phonograph with the Edison-perfected motion picture to make the first sound movies.

Many wonderful stories surround the life of Edison. He began each working day by exchanging humorous stories with his laboratory associates. He always did research on many different problems at the same time, and would shift from one to another as he ran into obstacles to which he could not see any solution at that moment.

As he said, "I never allow myself to become discouraged under any circumstances."

Before Edison began actual experimentation on a new problem, he carefully studied

what had been accomplished previously. As Edison himself said:

"When I want to discover something, I begin by reading up everything that has been done along that line in the past—that's what all these books in the library are for. I see what has been accomplished at great labor and expense in the past. I gather the data of many thousands of experiments as a starting point, and then I make thousands more."

Edison's experiments were carefully recorded in a series of notebooks. He used books containing from 250 to 300 pages.

Altogether about 2,500 of these note books are now preserved in an air-conditioned steel and concrete underground vault on the grounds of Edison's laboratory at West Orange, New Jersey. This is now part of the Edison Laboratory National Monument which is open to the public.

The oldest book in the collection is dated 1878. About 200 of them are filled with experiments leading to development of the incandescent electric light. Notations, most of which are in pencil, record results of experiments or instructions for new experiments that would provide a fresh attack on a problem.

Edison's long hours of work with only four to six hours of sleep at night amazed his friends. Asked about his philosophy of life a few years before his death, Edison said it was, "Work—bringing out the secrets of nature and applying them for the happiness of man."

Edison's laboratory has been called "the cradle of American industry" because of the many new industries that his inventions



YOUNG EDISON—As a young boy, he began his habit of experimenting. He carefully saved to buy books about science and chemicals for use in his self-built laboratory.

fostered. For example, he created the electric power industry by inventing not only the lamp, but also meters, conductors, the power plant electric generators, fuses, etc., to distribute electricity over large areas through the streets of a city to individual homes, factories, and offices.

The energy unleashed by electric power was made a servant in the home through vacuum cleaners, electric stoves, washing machines, refrigerators. Radio, television and the phonograph added to the pleasure of millions of people.

Edison's invention, thus, not only created new industries and new jobs but made everyday living more comfortable and more enjoyable.

Edison invented the industrial research laboratory. His was the first one of the 4,000 in America today. From these research laboratories, and others that will be founded in the future, a whole new world of science and technology is emerging.

Science News Letter, February 9, 1957

TECHNOLOGY

World Going Down to Sea in Atomic Ships

► THE WORLD is going down to the sea in atomic ships.

The United States already has two sea-going atomic submarines, the Nautilus and the Seawolf. Thirteen more nuclear subs are planned. Plans are complete for an 85,000-ton atom-powered aircraft carrier to be built by the Navy. The largest ship in the world, it will be driven by eight atomic engines. Now, a joint AEC-Maritime Administration program calls for the development of nuclear powered merchant ships.

Japan has announced plans to build the world's largest submarine, an atomic-propelled oil tanker. Designed to cruise at 22 knots, the Japanese underwater cargo vessel will weigh 30,000 tons.

Russia is already building an atomic ice-breaker and hopes to launch it from a Leningrad shipbuilding yard sometime this year. The first Russian ship to be atomic-powered, the ice breaker will displace 16,000 tons and, like the Japanese sub, will travel along at 22 knots.

Great Britain has jumped into the atomic ocean and is completing plans on the drawing board for the Royal Navy's first atomic submarine.

But like the slogan of the U. S. Naval hero, John Paul Jones, the world's ship designers and builders "have not yet begun to fight."

Experts foresee the atomic merchant fleet of tomorrow that includes fishing vessels that are floating factories, sending finished products from ship to market; mining ships for drilling underwater oil; and atomic ships that can "duck" under water in rough weather.

The experts point out that atomic ships will be faster, larger and more economical. They think the pioneer atomic ship may be either a large tanker, a dry cargo ship or a combined passenger-cargo ship.

Science News Letter, February 9, 1957

CHEMISTRY

Some Body Waste Is Reused by Body

► A SIGNIFICANT portion of one of the body's waste products, uric acid, is reused by the body.

Until recently it was generally believed that uric acid was strictly a waste product excreted in the urine. Then scientists found they could account for only about 85% of the daily uric acid output in the urine.

Using radioactive carbon as a tracer, a group of University of California scientists have found that 10% to 16% of uric acid output is channeled back into the body's metabolism.

The uric acid apparently takes part in normal body processes, the scientists found.

The researchers injected radioactive carbon dioxide into normal people and people with gout and polycythemia. In polycythemia, a blood disease, there is an increase in uric acid in the body, and it is lodged in the joints. Polycythemia patients, as a result, often have gout.

The radioactive carbon missing from the urine was found in exhaled carbon dioxide. This meant that 10% to 16% of the uric acid was broken down by the body, one product being radioactive carbon dioxide.

The findings were reported to the meeting of the American Federation for Clinical Research in Carmel, Calif., by Drs. M. Pollycove, B. M. Tolbert, J. H. Lawrence, and D. Harman of the University's Donner Laboratory.

Science News Letter, February 9, 1957

MEDICINE

Small Radiation Doses Cause Blood Changes

► RADIATION doses smaller than those officially permitted in atomic installations and research laboratories can produce detectable, although not necessarily harmful, changes in the blood.

This was reported to the American Federation for Clinical Medicine meeting in Carmel, Calif., by Dr. R. Lowry Dobson of the University of California's Donner Laboratory.

Dr. Dobson's results came from a more

extensive investigation of an observation first made at the University of Rochester in 1949. Rochester scientists found that in researchers receiving permissible, although unmeasured, doses of radiation there was an increase in an anomalous type of lymphocyte, a kind of white cell.

The anomalous cells have two nuclei instead of the normal one, and are called binucleated cells. The binucleated variety occur in normal individuals at a rate of about one in 50,000.

Dr. Dobson found that an increase—to an average of six binucleated lymphocyte cells in 50,000—occurred in 17 scientists exposed to an average of 200 milliroentgens (mr) of gamma and X-radiation per week for short periods. The permissible dose is 300 mr per week.

This increase appears to be small, and can be detected only by elaborate statistical methods, Dr. Dobson said.

The scientist stated that there is no present evidence that this increase is a hazard to health.

The main object of the study is to determine the smallest amounts of radiation that can cause physiological changes, what these changes are, and whether over a long period of time small radiation exposures—such as those incurred by atomic workers and by people receiving X-rays—pose any hazard.

Binucleated cell increases are also observed in certain diseases, such as hepatitis and mononucleosis and possibly in carbon tetrachloride and other poisonings.

Hazards from the small increases in binucleated cells appear to be minor when compared to those incurred by smoking, dietary indiscretions, automobile travel, etc., Dr. Dobson said.

Science News Letter, February 9, 1957

RAPID CALCULATIONS

by A. H. Russell

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THE ADVANCEMENT OF SCIENCE: Vol. XIII, No. 51, Dec. 1956—H. Hamshaw Thomas, Chairman, Editorial Committee—*British Association for the Advancement of Science*, 95 p., illus., paper, 7 Shillings and sixpence. Reporting the 1956 Sheffield meeting of the Association.

ANIMAL NAVIGATION: How Animals Find Their Way About—J. D.Carthy—*Scribner's*, 151 p., illus., \$3.95. Telling how the insect, the worm, the mollusk, the mammal and the bird find their way to an objective and home again.

ASPECTS OF HUMAN EQUALITY: Fifteenth Symposium of the Conference on Science, Philosophy and Religion—Lyman Bryson, Clarence H. Faust, Louis Finkelstein and R. M. MacIver—*Conference on Science, Philosophy and Religion* (Harper), 431 p., \$5.00. Includes papers by 25 leaders in this field.

ATMOSPHERIC MODELS: Air Force Cambridge Research Center—*Missile and Ordnance Systems Department, General Electric*, 28 p., illus., paper, free upon request direct to publisher, 3108 Chestnut St., Philadelphia, Pa., Attention: Product Information. Presenting in tabular and topological form much information about the upper atmosphere.

ATOMS AND THE UNIVERSE: An Account of Modern Views on the Structure of Matter and the Universe—G. O. Jones, I. Rotblat, G. J. Witrow—*Scribner's*, 254 p., illus., \$4.50. A survey of modern physics for the science student and also for the general reader.

CEREBRAL PALSY: Advances in Understanding and Care—Viola E. Cardwell—*Association for the Aid of Crippled Children*, 625 p., illus., \$5.00. A textbook for professional students and personnel specializing in the field.

ENCYCLOPEDIA OF CHEMICAL TECHNOLOGY: Volume 15, Waxes to Zymosterol and index to volumes 1-15—Raymond E. Kirk and Donald F. Otmer, Eds.—*Interscience*, 936 p., illus., \$30.00. Clear descriptions of the processes used in industry or the home to produce various chemical products.

THE ENCYCLOPEDIA OF CHEMISTRY: George L. Clark, Ed. in chief—*Reinhold*, 1037 p., illus., \$19.50. A single integrated volume of refer-

ence in which the contributions of hundreds of authorities provide data for the scientist, engineer and student.

HIGHWAY RESEARCH BOARD, PROCEEDINGS OF THE THIRTY-FIFTH ANNUAL MEETING:—Fred Burggraf and Elmer M. Ward, Eds.—*Highway Research Board*, 840 p., illus., \$10.00. Of particular interest to highway engineers and those concerned with the cost and financing of highways.

HOW TO SURVIVE ON LAND AND SEA: Individual Survival:—Frank C. Craighead, Jr. and John J. Craighead, revised by the authors and O. Paul Carmi—*United States Naval Institute*, 2d rev. ed. prepared by the V-Five Association of America, 368 p., illus., \$4.00. Designed originally for the use of instructors and trainees in naval aviation, this comprehensive book would also be of value to Boy Scouts, explorers or anyone else who must stay alive under difficult conditions.

THE HUMAN MACHINE: Biological Science for the Armed Services:—Charles W. Shilling—*United States Naval Institute*, 292 p., illus., \$5.00. What the individual needs to know about the human body and its health, prepared especially for men in the armed services.

MAN UNLIMITED: Technology's Challenge to Human Endurance:—Heinz Gartmann, translated by Richard and Clara Winston—*Pantheon*, 214 p., illus., \$4.50. A rocket and jet researcher discusses the stress imposed on man by his newest inventions and the human body's ability to adapt to and withstand such strains.

THE PHYSICIAN-WRITER'S BOOK: Tricks of the Trade of Medical Writing:—Richard M. Hewitt—*Saunders*, 415 p., illus., \$9.00. Help for the physician in preparing a report for publication. The author is with the Mayo Clinic.

PREGNANCY AND BIRTH: A Book for Expectant Parents:—Alan F. Guttmacher—*Viking*, 335 p., illus., \$4.50. An obstetrician answers the many questions that arise in the minds of young mothers and fathers-to-be.

QUESTIONS AND PROBLEMS IN SCIENCE: Test Item Folio No. 1:—Paul L. Dressel and Clarence H. Nelson—*Cooperative Test Division, Educational Testing Service*, 805 p., illus., paper, \$27.50. Help for the science teacher who must make up an examination at the end of his course.

REPORT ON CONTINUED STUDY OF WASTE WATER RECLAMATION AND UTILIZATION:—Sanitary Engineering Research Laboratory—*State Water Pollution Control Board (Calif. State Printing Division)*, 90 p., illus., paper, \$1.45. One useful approach to the problem of water shortage is the salvaging of waste water for re-use.

THE ROCKEFELLER FOUNDATION ANNUAL REPORT, 1955:—Dean Rusk, President—*Rockefeller Foundation*, 350 p., illus., paper, free upon request direct to publisher, 49 West 49th St., New York, N. Y. Reporting how the Foundation used some \$19,000,000 for the "well-being of mankind throughout the world."

TRANSISTOR ENGINEERING: Reference Handbook:—H. E. Marrows—*Rider*, 288 p., illus., \$9.95. Reference work for engineers, students and researchers.

THE VENTRAL INTERSEGMENTAL THORACIC MUSCLES OF COCKROACHES:—L. E. Chadwick—*Smithsonian, Miscellaneous Collections*, Volume 131, Number 11, 30 p., illus., paper, 40 cents. Cockroaches, which have persisted in much of their present outward form since the Carboniferous Age, are here shown to retain very primitive muscles.

WOMEN OF FORTY: The Menopausal Syndrome:—M. E. Landau—*Philosophical Library*, 49 p., \$2.50. A woman physician writes about that period of a woman's life which the author indicates should be the beginning of a new career.

Science News Letter, February 9, 1957

GEOLOGY

Find Important New Geological Fault

► AN IMPORTANT new geological fault has been found near Los Angeles, but there's no evidence that it has contributed to recent California earthquakes or landslides.

The discovery was made during a survey of the Santa Monica Mountains by Dr. Cordell Durrell, professor of geology at the University of California at Los Angeles.

The Santa Monica Mountains separate the Los Angeles basin from the San Fernando Valley and have provided outdoor locations for many Hollywood motion pictures.

The fault, called the Malibu Bowl fault, is important but as yet little-known, according to Dr. Durrell. It runs a little north of west in the area of Solstice and Escondido Canyons, about three miles north of the Pacific Ocean.

The vast difference in rocks on one side of the fault from those on the other suggests a considerable lateral movement.

Many faults are to be found in the rugged coastal mountain area. The longest is the Malibu Coast fault system which separates the Santa Monica Mountains from the Los Angeles basin. It runs from many miles north of Malibu Creek to the Hollywood area. It is apparently an old fault with a late and large lateral movement.

Also discovered in Dr. Durrell's survey was a 12,000-foot thick volcanic formation. It was formed by an undersea volcanic eruption that occurred when the area was part of the ocean floor.

Science News Letter, February 9, 1957

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Do You Know?

Horizontal *silos* are constructed either by digging huge trenches in the earth or by building side walls of lumber or earth on the surface.

Leading edges of the *wings* of a new U. S. supersonic jet fighter are so sharp they must be covered with rubber "gloves" to prevent ground crews from cutting themselves while the plane is being serviced.

The casings around frankfurters and sausages are sometimes made of *seaweed*.

Hippopotamus, elephant and buffalo *populations* in East Africa have reached record high levels.

Rubber used in the landing gear system of a modern jet bomber is sufficient to manufacture 100 automobile tires.

Less than one percent of the 35,000 species of *fishes* known in the world are now being utilized either as food or as oil, animal feed or fertilizer.

Just enough pruning to shape the tree and limit its height is best for *peaches*; they require the greatest possible leaf area for maximum yields.

A new jet fighter carries 104 air-to-air *rockets*.

The U. S. has more than 188,000 miles of *pipelines*.

A psychologist has devised a test of *compatibility*—how well people will work together in any small group with a job to do.

GEOPHYSICS

Effects of Atmosphere On Radio Propagation

See Front Cover

▶ **TRACKING** and radio guidance of long-range missiles and anti-missile devices require precise knowledge of the refractive effects of the earth's atmosphere.

Using the sun as the source of radio frequency energy, the Air Force Cambridge Research Center of the Air Research and Development Command is studying the atmosphere's effects on microwaves and meter wavelength radiation. Both the ionosphere and the troposphere produce refractive effects and scintillations, or "twinkling," on radio waves from the sun.

Shown on the cover of this week's *SCIENCE NEWS LETTER* is a multiple exposure photograph of the rising sun taken at five-minute intervals. It visually demonstrates the atmospheric effects, since the sun as it rises

appears to travel along an arc rather than along a straight line.

The amount of refraction is measured by timing the difference between the sun's crossing the pattern as recorded on the radio telescope and the time it should cross, according to spherical astronomy.

The absorption of the atmosphere as a function of angle of elevation and meteorological conditions is also determined.

Science News Letter, February 9, 1957

ASTRONOMY

New Comet Will be Visible to Naked Eye

▶ A **BRIGHT** new comet will be visible to the naked eye in late April and early May.

It may shine at zero magnitude, making it one of the most brilliant objects in the sky at that time. Known as Comet Arend-Roland, the object was discovered on Nov. 8, 1956, a correction of the Nov. 6 date originally reported. (See *SNL*, Dec. 1, 1956, p. 345.)

Since then astronomers both here and abroad have followed it with their telescopes and now have sufficient observations to plot its future path in the sky.

Although it can be seen by persons in the Southern Hemisphere before dawn during the first half of April, people in the Northern Hemisphere will not be able to look at it until the end of April and the beginning of May, after sunset. Then the comet will have passed between the earth and the sun.

Its brilliance will fade rapidly and it will disappear from naked-eye view by the first of June. During the last part of April it will appear very low in the northwest sky after sunset.

Science News Letter, February 9, 1957

MEDICINE

Broken Bones Need Gentle Handling

▶ **THE POSSIBILITY** of death from a fat embolism occurring after a broken bone can be markedly reduced by gentle handling and the use of a tourniquet, Dr. Leonard F. Peltier, head of orthopaedic surgery at the University of Kansas, told the American Academy of Orthopaedic Surgeons meeting in Chicago.

Fat embolism results from fat droplets which plug up blood vessels and it is sometimes fatal in long bone fractures. Bone is an ideal setting for this invasion of fat droplets into the general blood stream because of the bone's high fat content and large network of blood vessels.

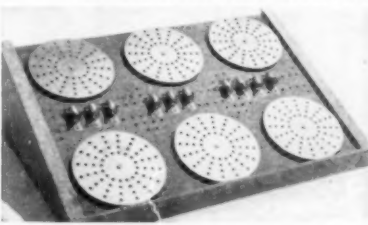
These droplets then travel quickly to the vessels of the lung and block off capillaries. Death from fat embolism shortly after injury is caused by heart failure due to mechanical blockage of the pulmonary vessels by emboli, Dr. Peltier reported.

The chances of fat embolism taking place can be reduced by keeping the patients quiet and not subjecting them to rough handling or unnecessary manipulation.

In surgery, a tourniquet should be used on the long bones whenever possible, he advised. This confines the fat particles and prevents occurrence of embolism.

Science News Letter, February 9, 1957

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Questions

CHEMISTRY—Which of the body's waste products is reused by the body? p. 91.
Why do people suffering from phenylketonuria have white hair? p. 89.

GENERAL SCIENCE—At what age is the human embryo most sensitive to radiation? p. 83.

GEOLOGY—What new geological fault has been found near Los Angeles? p. 92.

MEDICINE—What tranquilizing drug slows the growth of cancer? p. 89.

METEOROLOGY—Predictions of what stream may become a regular part of routine weather service? p. 87.

PHYSICS—Which of his inventions was Edison's favorite? p. 90.

SURGERY—From what part of the leg has useless tissue been removed in order to straighten deformed legs and feet? p. 88.

Photographs: Cover, U. S. Air Force; General Electric, p. 83; North American Aviation, p. 85; Fremont Davis, p. 87; Thomas Alva Edison Foundation, Inc., p. 90; Bakelite Company, p. 96.

PHYSICS

Neutrinos Now Detected Nearly One Per Minute

► NEUTRINOS, an uncharged atomic ghost particle with a vanishingly small mass, are now being detected at the rate of nearly one per minute using a counter installed deep underground near the Atomic Energy Commission's Savannah River Plant in South Carolina.

Dr. Frederick Reines of the Los Alamos Scientific Laboratory, Los Alamos, N. Mex., reported that this relatively high rate means that more neutrinos were falling on the detector each second than the number of seconds since the beginning of the universe.

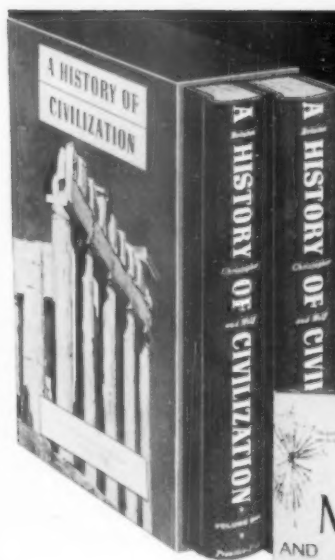
He explained to the American Physical Society meeting in New York that, although the giant scintillation counter used was very sensitive, it still detected only one neutrino for every ten million million million (10 to the 19th power) neutrinos hitting it.

Dr. Reines said Dr. Clyde Cowan, Jr., also of Los Alamos, assisted by Drs. H. W. Kruse, R. Jones and M. P. Warren, co-operated in measuring the energy distribution of neutrinos.

More than 20 years ago two Nobel laureates, Wolfgang Pauli and the late Enrico Fermi, suggested the existence of a neutrino in order to account for the mysterious disappearance of energy from a radioactive process known as beta decay.

The energy distribution measurements reported at the meeting give a further check to this 20-year-old theory.

Science News Letter, February 9, 1957



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❁ **SYNTHETIC PARAFFIN** is described as exceptionally hard and has a melting point of 214 degrees Fahrenheit. The wax, a South African development, is a hydrocarbon wax, derived from low-grade coal. It can be used as a modifier in varying percentages for petroleum waxes used in polish formulations, and rubber and plastic processing.

Science News Letter, February 9, 1957

❁ **ELECTRIC KNIFE SHARPENER** hones blades ranging from the finest hollow-ground carving knife to the smallest paring knife. Powered by an air-cooled motor, it never needs oiling. The sharpener has a beveled wheel and guide slots for the blades. It is housed in an ivory-colored acetate plastic case.

Science News Letter, February 9, 1957

❁ **CHEMICAL APPLICATOR** is designed to be attached to the garden hose. A solution is put into a Mason jar which, together with the mixer, is attached to the hose nozzle. A change of the nozzle head produces either a fine mist or a jet stream.

Science News Letter, February 9, 1957

❁ **CLOTHES SPRINKLER**, shown in the photograph, to help the busy housewife with her ironing chores, holds 16 ounces of water. Molded of a polyethylene plastic,



the sprinkler is unbreakable and will not rust. It has a tight fitting, snap-on lid in chalk white. The container is available in red, yellow, pink or turquoise.

Science News Letter, February 9, 1957

❁ **GOLFING PRACTICE** in the backyard is possible with a non-breakable plastic

golf ball mounted on a six and one-half inch rod. The rod is inserted at right angles in a wooden stake in the ground. When the ball is hit with either a wood or an iron, the ball goes around in a circle.

Science News Letter, February 9, 1957

❁ **WALL PAINT** made in Holland absorbs ultraviolet light rays. Designed for industrial areas where welding torches are in use, the paint can also be used in hospitals. The paint is made in three different surface-types: cement, concrete and brick; wood or metal; and asbestos or canvas.

Science News Letter, February 9, 1957

❁ **HOT DOG SKEWER** roasts six wieners at a time. A clasp locks the skewer end, so that food does not slip off into the fire. The roaster fork is 30 inches long, with a wooden handle. When the food is cooked, the tines are unsnapped by means of a peg.

Science News Letter, February 9, 1957

❁ **AUTOMOBILE-DEODORIZER** is designed to be attached to a car's air conditioner. Eliminating gas fumes from a car ahead or from a dead skunk, the air cleaner is a slowly evaporating solid. The deodorizer for autos will clear the air of odors from garlic to rubber and leather to perspiration, the makers state.

Science News Letter, February 9, 1957



Nature Ramblings



By HORACE LOFTIN

➤ IF YOU ARE NEAR desert or semi-desert areas of the American West late this winter or early spring, you may notice that the ever-present kangaroo rats seem unusually active. They may hardly seem to pause in their constant trips to and from their dens.

If you look closer at the desert, you may guess the reason for this burst of activity. Patches of greenery will dot the desert floor, the result of the few winter rains. Soon this green will turn to brown under the desert sun. The kangaroo rats depend on this sparse vegetation for food, and while it is available they must work overtime to collect and store the green grass seeds.

The den of the giant kangaroo rat, *Dipodomys ingens*, is a maze of tunnels and rooms, with numerous side pockets for storage of seeds and other foods. Now in the season of seed collecting, the soil is

Desert Harvesters



moist and if green seeds were carried directly to an underground storage room they might quickly rot. So to be safe, this kangaroo rat temporarily stores his hoard of green seeds in shallow pits on the ground about his den. Here they are left for two months or longer to dry in the hot sun. When cured to the kangaroo rat's satisfaction, the seeds are taken below ground.

There are several species of kangaroo rats, ranging from about six to 15 inches in length. Actually, they are not "rats" but ground-dwelling "squirrels." They are found in desert and semi-desert areas of the West, from Oregon and Wyoming south to Mexico.

Their hind legs are greatly elongated, the fore legs small and the tail long, giving them a "kangaroo" appearance. The tail typically ends in a large tuft of hair. Like their namesake, kangaroo rats get around rapidly by prodigious leaps with their exaggeratedly long hind limbs.

The mounds of the kangaroo rat are a common sight in much of the West. These mounds may measure 10 by 12 feet on the sides, 18 inches above and about the same below the ground.

There may be a dozen or more entrances leading into a single mound, with holes large enough to admit a kangaroo rat on a dead run.

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